REMARKS

This is a full and timely response to the non-final Office Action mailed by the U.S. Patent and Trademark Office on February 25, 2005. Claims 1-39 remain pending in the present application. Claims 1, 13, 20, 27, 31 and 35 are amended. Applicants respectfully submit that support for the amendments can be found in the specification at least on page 11, lines 10-14 and with respect to FIGS. 3A, 3B and 3C. In view of the foregoing amendment and following remarks, reconsideration and allowance of the application and all pending claims are respectfully requested.

Each rejection presented in the Office Action is discussed in the remarks that follow.

Rejections Under 35 U.S.C. § 102

Claims 1-8, 11-16, 19-23 and 26-29 stand rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by U.S. Patent No. 6,567,587 to Kashihara *et al.* (hereafter *Kashihara*). A proper rejection of a claim under 35 U.S.C. § 102 requires that a single prior art reference disclose each element of the claim. *See, e.g., W.L. Gore & Assoc., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303, 313 (Fed. Cir. 1983).

Applicants respectfully submit that claims 31-34 are not specifically mentioned in paragraph 2 as being rejected. Claims 31 and 32 are mentioned in the body of the rejection on page 6 of the Office Action. However, claims 33 and 34 are not treated in the Office Action. Applicants will address the rejection to claims 31 and 32, but request clarification as to whether claims 33 and 34 are rejected.

Kashihara discloses a dispersion compensator with Bragg gratings which have a dispersion compensating function and are formed on output waveguides of an arrayed waveguide grating, and a dispersion-compensating module employing the dispersion compensator. *See Kashihara*, Abstract. According to *Kashihara*, "the output waveguides 7 each have the Bragg grating 7b which has the dispersion compensation function." *See Kashihara*, col. 3, lines 28-30. *Kashihara* continues stating "[i]n this context, the light, which are demultiplexed according to their wavelengths and output into the different output waveguides 7, are reflected off each of the Bragg gratings 7b and dispersion compensated. Then, the light pass through the same path in reverse fashion to

be multiplexed and are then output from one of at least one input waveguide 3 as wavelength-multiplexed light." *See Kashihara*, col. 3, lines 30-37.

Importantly, nowhere does *Kashihara* disclose, teach or suggest dispersion compensation over a plurality of wavelengths in what the Applicants have described as "inter-wavelength" compensation where individual wavelengths are relatively delayed to reduce inter-wavelength spectral dispersion of the optical signal across the wavelengths. *See* Application, page 3, lines 17-18. Further, Applicants dispersion compensation elements alter the timing of a signal portion on each of a plurality of wavelengths, where the dispersion compensation elements operate on all wavelengths simultaneously to reduce inter-wavelength spectral dispersion across the wavelengths. *See* Application, page 3, line 23 to page 4, line 2. Applicants respectfully submit that their invention provides spectral dispersion compensation simultaneously and concurrently on each wavelength and across all wavelengths. *See* Application, page 11, lines 10-12.

Indeed, the compensation bandwidth, Bw, of the Bragg gratings 7b described by *Kashihara* in equations 2 and 6 is insufficient to compensate for spectral dispersion across multiple wavelengths, but instead is sufficient only to compensate for spectral dispersion on the signal wavelength alone. *Kashihara* even shows the Bragg gratings 7b in FIG. 1 and 20c in FIG. 3 as being identically formed and spatially aligned, thus further showing that *Kashihara* never intended its apparatus to compensate for spectral dispersion across a plurality of wavelengths. Each Bragg grating shown and described in *Kashihara* has sufficient bandwidth to compensate for spectral dispersion for only one wavelength, not across multiple wavelengths.

With particular regard to the claims, *Kashihara* fails to disclose, teach or suggest at least Applicants' apparatus for spectral dispersion compensation in an optical communication network, comprising "a demultiplexer adapted to receive the plurality of wavelengths and divide the plurality of wavelengths into individual wavelengths, the individual wavelengths relatively delayed to reduce inter-wavelength spectral dispersion

and to synchronize each portion of the signal with respect to time across the plurality of wavelengths," as recited in claim 1.

Similarly, *Kashihara* fails to disclose, teach or suggest at least Applicants' method for spectral dispersion compensation in an optical network comprising "simultaneously altering the relative timing among the wavelengths using a dispersion compensation element associated with each wavelength to reduce inter-wavelength spectral dispersion and to synchronize the distributed signal with respect to time across the plurality of wavelengths," as recited in claim 13.

Kashihara also fails to disclose, teach or suggest at least Applicants' apparatus for spectral dispersion compensation in an optical network comprising "means for simultaneously altering the relative timing of the wavelengths to reduce inter-wavelength dispersion and to synchronize the distributed signal with respect to time across the plurality of wavelengths," as recited in claim 20.

Similarly, *Kashihara* fails to disclose, teach or suggest at least Applicants' spectral dispersion compensator for an optical signal distributed over a plurality of wavelengths comprising "plural dispersion compensation elements for adjusting the relative timing of all of the wavelengths concurrently and for synchronizing the spatially divided optical signal with respect to time across the plurality of wavelengths," as recited in claim 27.

Kashihara also fails to disclose, teach or suggest at least Applicants' method for spectral dispersion compensation for an optical signal distributed over a plurality of wavelengths comprising "adjusting the relative timing of all of the wavelengths concurrently and for synchronizing the spatially divided optical signal with respect to time across the plurality of wavelengths," as recited in claim 31.

Applicants respectfully disagree with the statement in the Office Action that "the dispersion compensation of Kashihara is constructed as same as the claimed dispersion compensation, thus, it would be inherently that it is capable to reduce inter-wavelength spectral dispersion." Applicants respectfully submit that *Kashihara* merely discloses an

apparatus for reducing "intra-wavelength" spectral dispersion compensation, and nowhere mentions correcting for spectral dispersion and providing signal timing synchronization across a plurality of wavelengths.

Applicants respectfully submit that the operation of the spectral dispersion compensator described in columns 3 and 4 of *Kashihara* does not disclose, teach or suggest spectral dispersion compensation across a plurality of wavelengths. Specifically, *Kashihara* teaches "the light, which are demultiplexed according to their wavelengths and output into the different output waveguides 7, are reflected off each of the Bragg gratings 7b and dispersion compensated. Then, the light pass through the same path in reverse fashion to be multiplexed and are then output from one of at least one input waveguide 3 as wavelength-multiplexed light." *See Kashihara* column 3, lines 30-37. Further, *Kashihara* states that "in each of the Bragg gratings 7b, a period $\Lambda(x)$ is set in the longitudinal direction of the output waveguides 7 as follows: $\Lambda(x)=\Lambda 0+\alpha \bullet x$ where x is the position measured from the input end of the Bragg gratings 7b, $\Lambda 0$ is the grating period at the position of x=0, and α is the rate of chirping of the grating period." *See Kashihara,* column 3, lines 37-40. Indeed, *Kashihara* teaches that the Bragg gratings 7b are identically formed and nowhere does *Kashihara* disclose, teach or suggest spectral dispersion compensation over a plurality of wavelengths.

Accordingly, Applicants respectfully submit that independent claims 1, 13, 20, 27 and 31 are allowable over *Kashihara,* and furthermore, that dependent claims 2-8, 11-12, 14-16, 19, 21-23, 26, and 28-29, which depend either directly or indirectly from allowable independent claims are allowable for at least the reason that they depend from allowable independent claims. In re *Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1998).

Rejections Under 35 U.S.C. § 103

Claims 9, 17, 24, 30 and 35-39

Claims 9, 17, 24, 30 and 35-39 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over *Kashihara* in view of U.S. Patent No. 6,628,864 to Richardson et al. (hereafter *Richardson*). For a claim to be properly rejected under 35 U.S.C. § 103, "[t]he PTO has the burden under section 103 to establish a *prima facie* case of obviousness. It can satisfy this burden only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references." *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988) (Citations omitted). Further, "[t]he mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification." *In re Fritch*, 972 F.2d 1260, 1266, 23 U.S.P.Q.2d 1780 (Fed Cir. 1992).

As stated above, *Kashihara* discloses a dispersion compensator with Bragg gratings which have a dispersion compensating function and are formed on output waveguides of an arrayed waveguide grating, and a dispersion-compensating module employing the dispersion compensator, which operates on a single wavelength.

Richardson discloses optical code division multiple access (OCDMA) coder:decoder gratings. The modulated refractive index profile that makes up the OCDMA coder:decoder grating incorporates changes in polarity between OCDMA chips by discrete phase shifts, thereby to provide bipolar coding through phase modulation. *See Richardson*, abstract. However, *Richardson* fails to cure the defects of *Kashihara*.

Specifically, the proposed combination fails to disclose, teach or suggest at least Applicants' spectral dispersion compensation apparatus and method that compensates for spectral dispersion across a plurality of wavelengths.

With regard to independent claim 35, Applicants respectfully submit that the proposed combination fails to disclose, teach or suggest at least Applicants' optical

device comprising "dispersion-correction means for introducing relative delays among the encoded components to yield dispersion-corrected and temporally synchronized encoded components across a plurality of wavelengths."

Accordingly, Applicants respectfully submit that independent claim 35 is patentably distinct over the proposed combination of *Kashihara* and *Richardson*. Further, dependent claims 9, 17, 24, 30 and 36-39 are allowable for at least the reason that they depend either directly or indirectly from allowable independent claims. *In re Fine, supra.*

Claims 10, 18 and 25

Claims 10, 18 and 25 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over *Kashihara* in view of U.S. Patent No. 6,570,691 to Miyauchi et al. (hereafter *Miyauchi*).

Applicants respectfully submit that dependent claims 10, 18 and 25 are allowable for at least the reason that they depend either directly or indirectly from allowable independent claims 1, 13 and 20, respectively. *In re Fine, supra.*

CONCLUSION

For at least the foregoing reasons, Applicants respectfully request that all outstanding rejections be withdrawn and that all pending claims of this application be allowed to issue. If the Examiner has any comments regarding Applicants' response or intends to dispose of this matter in a manner other than a notice of allowance, Applicants request that the Examiner telephone Applicants' undersigned attorney.

Respectfully submitted,

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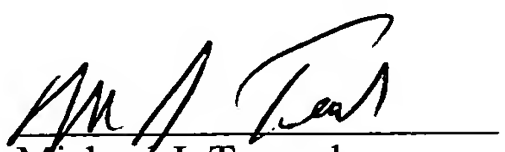
By: 

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